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ALTERATIONS IN CARDIAC STRUCTURE AND FUNCTION IN OVERWEIGHT ADOLESCENTS: DOES "OBESITY CARDIOMYOPATHY" EVOLVE IN CHILDHOOD?

ACC Poster Contributions
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Background: Three-fourths of overweight children (body mass index, BMI > 30) without intervention may remain obese as adults. A significant number of obese adults exhibit cardiometabolic related alterations in cardiac structure and function leading to heart failure. It is not known if alterations in cardiac structure and function develop with childhood obesity.

Methods: In a prospective study we tested the hypothesis that alterations in cardiac structure and function develop with childhood obesity and that these changes correlate with cardiometabolic risk factors present in obese children. Biophysical (BMI, blood pressure), biochemical (fasting glucose and insulin, insulin resistance, and lipid profile) and cardiac structural and functional indices (left ventricular mass, longitudinal strain and strain rate, and ejection fraction, EF, by echocardiography) in obese adolescents (N=31) were compared with age, gender, tanner and race matched normal controls (N=14). Multivariate analysis was performed to assess the effects of independent variables on indices of cardiac structure and function.

Results: There were significant differences in biophysical and biochemical indices between the groups. Cardiac structural and functional indices except for EF were abnormal in obese adolescents. By multivariate analysis fasting insulin levels and insulin resistance measured by homeostasis model assessment, had incremental negative correlation ($r = -0.64$ and -0.61, $p < 0.001$) with altered cardiac structure and function.

Conclusion: Obese adolescents already have developed alterations in cardiac structure and function which are incrementally associated with insulin resistance. We speculate this may represent pediatric onset of "obesity-cardiomyopathy" seen in obese adults.